Inhibitory effects of soluble fibronectin fractions on cultured neurones

Conference or Workshop Item

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Fibronectin (Fn) is an extracellular matrix glycoprotein involved in development and repair by promoting cell adhesion and consequent migration. It has been used experimentally as a scaffold in engineered constructs to promote peripheral and central nervous system repair (1-5). Certain preparations of shear-aggregated Fn, however, inhibit neurite growth in vitro and in vivo as previously demonstrated by this group (unpublished). The inhibitory effect is lost once the material is washed suggesting that a soluble diffusing factor from within Fn, may be responsible.

The aim of this study was to further investigate this feature. Shear-aggregated fibronectin was soaked in culture media or phosphate buffer saline (PBS) for 48 hours in order to obtain Fn-conditioned media and Fn-conditioned PBS. The latter solution underwent affinity chromatography to isolate fractions according to their ability to bind immobilized heparin or gelatin. The effect of Fn-conditioned media and each individual fraction on neuronal growth from dorsal root ganglia was tested in vitro using a quantitative immunofluorescent assay. Our results show that when used as a whole Fn-conditioned media appears to inhibit neurite growth minimally as compared to the control (normal growth media). However, from the individual fractions, the heparin-binding fraction completely blocked neuronal growth.

Studying this effect could improve our understanding of neuronal extension over biomaterials and offers a potential agent to incorporate into devices to reduce neuroma formation following repair/implantation.

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